Sapna Suthar

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EDUCATION

MCMASTER UNIVERSITY, *Bachelor of Electrical Engineering – Class of 2028* September 2023 – Present
Relevant Coursework: Logic Design, Data Structures & Algorithms, Microprocessor Systems, Principles of Programming, Circuit Analysis

ALTIUM EDUCATION PCB BASIC DESIGN COURSE May 2024 – July 2024
Created schematics, designed and routed a power regulator shield board to power a bank of LEDs and an Arduino Uno

EXPERIENCE

MCMASTER FORMULA ELECTRIC TEAM (FSAE COMPETITION) October 2023 - Present
Low Voltage Electronics Member

- Developed the front-controller printed circuit board (PCB) in Altium Designer, coordinating power distribution, integrating sensor data, and safeguarding the vehicle's tractive system for reliable operation.
- Made hardware enhancements to the board to enable firmware flashing over the CAN bus, consolidating all software into a single JTAG connection and reducing programming setup time by 80%.
- Implemented real-time fault detection for the brake power distribution system, enhancing safety monitoring and accelerating issue diagnosis.

LIDAR (LIGHT DETECTION AND RANGING) MAPPING SYSTEM April 2025

- Engineered a handheld LiDAR device for detailed indoor 3D mapping, enhancing obstacle detection and spatial awareness in confined environments.
- Developed embedded firmware to control scanning and data collection, ensuring reliable performance.
- Created MATLAB data-processing scripts to convert sensor output into visual 3D plots for clear analysis.

RXID February 2025

- Built a secure pill dispenser that only dispenses when a matching RFID bracelet is scanned, ensuring correct dosing and remote prescription updates, winning 1st place out of 66 teams at the MakeUofT 2025 Hackathon.
- Designed a mobile interface with React Native and Firebase, enabling real-time prescription management and encrypted patient-record synchronization.
- Developed Python firmware on Raspberry Pi to manage RFID authentication, control the dispenser, and enforce safety checks, ensuring accurate and secure medication dispensing.

QONNECTR January 2025

- Created a collaborative project-sharing platform with secure user authentication, winning the "Best Use of Auth0" award out of 134 teams at DeltaHacks XI.
- Developed the web interface and backend using React and Node.js with Auth0, implementing dynamic project feeds and on-demand QR code generation.
- Deployed on Vercel and integrated real-time Firebase data synchronization to demonstrate seamless live collaboration during the hackathon demo.

BINARY-CODED DECIMAL (BCD) TO 7 SEGMENT DISPLAY DECODER September 2024 – December 2024

- Designed a digital decoder translating decimal inputs into clear multi-segment numeric displays for improved readability.
- Assembled a breadboard prototype to validate each decoder logic path, confirming accurate output across all sixteen input codes and enabling rapid troubleshooting.
- Deployed the design onto an Intel MAX 10 field-programmable gate array with Quartus, delivering instantaneous display update.

SKILLS, ACTIVITIES AND INTERESTS

Coding Languages: Verilog, SystemVerilog, VHDL, C/C++, Python, Java, SQL, HTML, CSS, JavaScript, Flask
Software & Design Tools: Altium Designer, Quartus, MATLAB, Simulink, Git, VS Code, PSpice, LTSpice
Hardware & Technical Skills: FPGA Design, PCB Design, MS Office, CAD, Soldering
Activities: Scotiabank Unlock Your Future – Women in Technology Program (2023-2024), Women in STEM Ambassador (2023), Girls Who Code Co-President (2022-2023)